

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1 **Claim 1** (currently amended) Process for designing an electronic
2 system able to operate under ~~irradiation, characterized in that it~~
3 ~~comprises~~ X or gamma radiation comprising the following stages:
4 I. Enumerating all the function to be implemented by the
5 system;
6 II. determining ~~the~~ electronic components able to physically
7 implement these functions whilst giving preference to models having the
8 larger scale integration;
9 III. determining the volume of components which can be protected
10 by protection means referred to as shielding, whilst taking account of
11 ~~the~~ a radiation dose to be withstood by the system, the maximum
12 permitted weight of the material chosen for said shielding, as well as
13 the distance at which components selectively protected by said
14 shielding could be from other, unshielded components;
15 IV. establishing a list of the most vulnerable components,
16 whilst firstly taking account of their technology, then their degree of
17 integration, whilst associating with each of these components the
18 components which have to be installed in their immediate vicinity, if
19 existing, and whilst firstly positioning the most vulnerable component,
20 then that whose vulnerability is slightly less high and so on,
21 optionally ~~placing several~~ including identical vulnerability circuits;
22 V. selecting on the basis of the list of the preceding stage,
23 a group of components, commencing with the most vulnerable components
24 and limiting said group to components which, by their very dimensions,
25 can be installed in the volume defined in stage III;
26 VI. examining whether the components in said system can

27 implement coherent functions and only communicate with the remainder of
28 the system by ~~a reasonable number of wires~~, connection means which
29 transmit signals able to pass through without deterioration the
30 distance stipulated in stage III between the selectively protected
31 components and the other components; if all these conditions are not
32 simultaneously fulfilled, modifying by iteration the list of components
33 in order to obtain this result, but without exceeding the volume
34 defined in stage III; if all these con-ditions are simultaneously
35 fulfilled pass to the following stage, the group of components obtained
36 in this way being called the "first group of first components" and the
37 other components being called the "second group of second components";

38 VII. designing the physical installation of the first group of
39 first components, designing the shielding, constituted by at least one
40 radiation-absorbing material, positioned around said first group of
41 components, and designing between the first group of components and the
42 second, connection means arranged so as not to forma penetration path
43 for ambient radiation;

44 VIII. designing the physical installation of the second group of
45 components, evaluating the radiation dose which they have to withstand
46 and, if necessary, using a complimentary procedure for improving their
47 suitability for operating under irradiation by a technique other than
48 shielding;

49 IX. evaluating whether the solution to the set problem is in fact
50 obtained; if it is not obtained, modifying the parameters of stage III
51 and repeating the process as from stage III.

1 **Claim 2** (original) Process according to claim 1, comprising a
2 subsequent stage:

3 X. validating the design by producing a prototype in

4 accordance with the preceding design stages, at least with regards to
5 the first group of components, installed and fitted in its protection
6 means, and performing irradiation tests; if said tests are not in
7 accordance with the specifications, the parameters of stage III are
8 modified and the procedure is repeated as from stage III.

1 **Claim 3** (currently amended) Electronic system able to operate
2 under ~~irradiation, characterized in that it comprises X or gamma~~
3 radiation comprising:

4 - a first group of first components incorporating components
5 which are ~~intrinsically very~~ vulnerable to ~~such~~ said radiation, and
6 ~~possibly a few~~ associated elements which ~~must be physically~~ have to
7 ~~be~~ installed in their immediate vicinity, ~~called the first group (21)~~
8 ~~of first components, protected against said radiation by protection~~
9 ~~means (22) known as shielding,~~

10 - a shield of metal in which is defined a volume available for
11 protection against said radiation, wherein said first components are
12 situated in said shield,

13 - a second group ~~(20)~~ of second components, which ~~are less~~
14 ~~vulnerable~~ may withstand said radiation longer than the first group
15 and which are not protected by shielding, and

16 - ~~connection means (23, 25) between said two assemblies~~
17 ~~arranged~~ a flexible printed circuit for connecting the two groups of
18 ~~electronic components, said flexible printed circuit along a baffle~~
19 ~~provided at the input/output of the shield so as not to form to avoid~~
20 ~~forming~~ a penetration path for ~~ambient~~ said radiation.

1 **Claim 4** (original) System according to claim 3, wherein the
2 shield (22) is constituted by two half-shells (50, 51) protecting
3 said components (40, 41, 42, 43, 44, 45).

1
2
3 **Claim 5** (currently amended) System according to claim 3,
wherein the first group (21) of first components also incorporates at
least one microcontroller (40) located within ~~a~~ the shield (22).

1 **Claim 6** (currently amended) System according to claim 3,
2 wherein the first components located within ~~a~~ the shield (22) are
3 connected to an interface card (20) by ~~a~~ the flexible printed circuit
4 (23) ~~along a baffle (52) provided at the input/output of the shield.~~

1 **Claim 7** (currently amended) System according to claim 3,
2 wherein the first group (21) of first components comprises a
3 microcontroller (40) and an analog/digital converter (43) located
4 within ~~a~~ the shield (22) and connected to inter-faces, across ~~a~~ the
5 baffle in the shield, via flexible integrated circuits carrying:
6 ~~supplies (63),~~
7 - a multiplexed bus (64) belonging to the microcontroller (40), -
8 control and data signals (65) belonging to the converter (43), - the
9 analog input signal (66) of the converter (43).

1 **Claim 8** (original) System according to claim 3, wherein the
2 first group (21) of first components is mechanically connected to the
3 remainder of the system by a mechanical suspension (96, 97, 98).

1 **Claim 9** (original) System according to claim 8, wherein said
2 mechanical suspension is ensured by elastomer cores (98).

1 **Claim 10** (original) System according to any one of the claims 3
2 to 9, wherein between the first group of first components and the

Appl. No. 32378
Amdt. Dated April 9, 2003
Reply to Office action of December 20, 2002

3 shield is incorporated an electrically insulating, but thermally
4 conductive product, in order to remove via the shield the heat
5 generated by the operation of the electronic components.

1 Claim 11 (original) Application of the process according to
2 claim 1 to the electronic control of a mobile robot.